

ABSTRACT

FIR-Bright Galaxies with an Extreme [CII] Deficiency: Where are the PDRs?

S. Malhotra, C. A. Beichman, H. L. Dinerstein, George Helou, D. J. Hollenbach,
D. A. Hunter, K. Y. Lo, Steve Lord, N. Y. Lu, R. H. Rubin, N. Silbermann,
G. Stacey, H. Thronson, M. W. Werner

We find three Far-Infrared bright galaxies which are deficient in [CII] and [O1] lines, indicating weak PDR emission. These observations are from a sample of 25 galaxies observed the Long Wavelength Spectrometer (LWS) onboard the Infrared Space Observatory (ISO) and are made as part of the US ISO key project on ISM and starformation in normal galaxies (Helou et al. 1996). We have an upper limit to the [CII]/FIR ratio smaller than a few 10^{-4} . Of the three, NGC 4418 is unusual in having a seyfert nucleus and IC 860, CGCG 1510.8 +0725m have the highest FIR/blue luminosity (more than 25) in the sample. All these galaxies are detected in CO; IC 860 and CGCG 1510.8+0725m also have OH and H₂CO megamasers in the center, indicative of high density material exposed to high intensity radiation. The mid-infrared images show very compact nuclei (Silbermann et al. 1996). If the high luminosity ratio in FIR/blue is due to very active starformation we should see the [CII] and [O1] lines which arise from PDRs. On the non-starformation activity (e.g. an active nucleus) then we would see a higher than normal F_R/Blue color and low [CII]/FIR. We discuss the implications of our upper limits on [CII]/FIR, and other possible interpretations.

ISO (the Infrared Space Obs) is an ESA mission with participation by NASA and ESA. The LWS (Long Wavelength Spectrometer) was built by Clegg et al (1996, A&AL, Nov 10 issue).